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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,983	09/05/2003	Viktor P. Astakhov	FMC1442PUSP/202-0104/8107	8942
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BROOKS KUSHMAN P.C./FGTL 1000 TOWN CENTER 22ND FLOOR SOUTHFIELD, MI 48075-1238			EXAMINER GATES, ERIC ANDREW	
			ART UNIT	PAPER NUMBER
			3722	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/655,983	Applicant(s) ASTAKHOV ET AL.	
	Examiner Eric A. Gates	Art Unit 3722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/5/03, 5/7/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-21, in the reply filed on 18 November 2005 is acknowledged.
2. Claims 22-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 18 November 2005.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 13 recites the limitation "the tubular shank passageway" in line 3. There is insufficient antecedent basis for this limitation in the claim, as it is unclear which tubular shank passageway is being claimed.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Karlsson et al. (U.S. Patent 5,947,660).

8. Regarding claim 1, Karlsson et al. discloses a gundrill for forming deep holes in a body of material as the gundrill is relatively rotated, axially advanced and supplied with drilling fluid, the gundrill comprising: an elongate tubular shank 12 having a driven end 40, a distal end 24 and a central region 12 extending therebetween along a central axis, the tubular shank 12 having a cross-section defining a shank flute 18A extending from the distal end for at least a substantial portion of the length of the central region, providing a portion of an elongate fluid return path between the hole being drilled and the shank flute, allowing drilling fluid, which is pumped into an internal fluid passage 23A formed through the tubular shank to exit the hole being drilled removing chips as they are formed; and a cutting tip 10 affixed to the distal end of the tubular shank, the cutting tip having an internal fluid passageway 23 which is coupled to the tubular shank internal passageway 23A and terminates in an orifice 23 formed in a tip end surface 15, a tip flute 18 extending axially from the tip end surface toward and generally aligned with the shank flute 18A providing a portion of the elongate fluid return path, the tip flute defined by a secondary flank surface (not labeled, see Figure 2) and a generally radially

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extending primary rake surface (not labeled, see Figure 2) having a peripheral rake edge 20 lying on a cylindrical surface coaxial with the central axis, and a generally radially extending cutting edge 19 at the tip end which defines a radially offset point (not labeled, see Figure 3); wherein the surface of the cutting tip circumferentially behind the peripheral rake edge 20 as the gundrill rotates deviates inwardly sufficiently from the cylindrical hole to form an enlarged localized relief passage (not labeled, see Figures 2 and 4, in between labels 23 and 20 in Figure 4) which provides an alternative exit path for drilling fluid, the relief passage extending from the tip end toward the tubular shank member.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Applicant's Admitted Prior Art. To overcome the rejections below based upon the multiple studies referred to on pages 19-21 of the specification, applicant must submit copies of the studies, including study authors and dates, with the response to this office action.

10. Regarding claim 2, Karlsson et al. discloses wherein the tip end surface 15 of the cutting tip 10 cooperates with the hole being drilled, forming a pressurized end

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clearance volume which receives drilling fluid through the tip orifice 23 and discharges drilling fluid through the relief passage (not labeled, see Figures 2 and 4, in between labels 23 and 20 in Figure 4) and an outlet passage 18, which is generally bounded by the distal edge of the secondary flank surface (not labeled, see Figure 2) and the bottom of the hole being drilled. Karlsson et al. does not disclose the tip end surface of the cutting tip cooperates with the hole being drilled to define a toroidal bottom space area having a portion thereof which lies between the end of the tip and hole bottom.

11. Applicant's Admitted Prior Art teaches a tip end surface of a cutting tip (Figures 11 through 11C) that defines a toroidal bottom space area for the purpose of utilizing two cutting tips. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the drill of Karlsson et al. with the cutting tip end surface of Applicant's Admitted Prior Art in order to have a drill that cuts more effectively.

12. Regarding claim 3, the modified invention of Karlsson et al. discloses the invention substantially as claimed, except Karlsson et al. does not disclose wherein the drilling fluid exiting the outlet passage into the elongate fluid return path initially forms an angle β , relative to the axis of the hole being drilled when viewed radially, which is sufficiently large to effectively cool the tip cutting edge without stagnation.

13. Pages 19-20 of the specification of the instant application disclose multiple prior art studies that have been performed that teach that the drilling fluid exiting the outlet passage into the elongate fluid return path initially forms an angle β , relative to the axis of the hole being drilled when viewed radially, which is sufficiently large to

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effectively cool the tip cutting edge without stagnation when beta is 66 degrees or more, thereby showing that having an angle of 66 degrees or higher is desirable for the purpose of effectively cooling the tip cutting edge by minimizing drilling fluid stagnation.

The multiple prior art studies also teach that having the minimum cross-sectional area of the outlet passage less than a longitudinal cross sectional area of the bottom space taken along the hole axis is desirable for the purpose of increasing the static drilling fluid pressure and increasing angle beta. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined Applicant's Admitted Prior Art with the angle beta taught in the multiple studies of Applicant's Admitted Prior Art in order to improve the cutting fluid cooling to the tip edge.

14. Regarding claim 4, the modified invention of Karlsson et al. discloses the invention substantially as claimed.

15. Regarding claims 5-6, the modified invention of Karlsson et al. discloses the invention substantially as claimed except for the specific value ranges given in the claims. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the range more specific than that given in claim 4, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

16. Regarding claim 7, the modified invention of Karlsson et al. discloses the invention substantially as claimed, as taught above in paragraph 10.

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17. Regarding claims 8-10, the modified invention of Karlsson et al. discloses the invention substantially as claimed except for the specific value ranges given in the claims. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the range more specific than that given in claim 7, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

18. Regarding claim 11, the modified invention of Karlsson et al. discloses the invention substantially as claimed, further disclosing wherein the tubular shank 12 is provided with a crossover port (open area under 20 in lower left corner of Figure 3, also see Figure 2) connecting the relief passage to the elongate fluid return path 18.

19. Regarding claim 12, the modified invention of Karlsson et al. discloses the invention substantially as claimed.

20. Regarding claim 13, the modified invention of Karlsson et al. discloses wherein the crossover port is configured to introduce a jet of drilling fluid into the tubular shank passageway 18 at an angle which assists the drilling fluid and entrained chips to exit the hole being drilled.

21. Regarding claim 14, the modified invention of Karlsson et al. discloses wherein the area of the outlet passage is sufficiently small in relation to the area of the relief passage so that a percentage of the drilling fluid exits the end clearance volume through the relief passage. The modified invention of Karlsson et al. does not distinctly disclose that the percentage is 10 percent. However, it would have been obvious to one having

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ordinary skill in the art at the time the invention was made to have used the optimum range required for the purpose of maximizing beta and hence the flow of coolant fluid, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

22. Regarding claims 15-16, the modified invention of Karlsson et al. discloses the invention substantially as claimed.

23. Regarding claims 17-18, the modified invention of Karlsson et al., as taught in paragraphs 12-13 and 17 above, discloses the invention substantially as claimed.

24. Regarding claim 19, the modified invention of Karlsson et al., as taught in paragraphs 15 and 17 above, discloses the invention substantially as claimed.

25. Regarding claims 20-21, the modified invention of Karlsson et al., as taught in paragraphs 15, 17, and 21 above, discloses the invention substantially as claimed.

Conclusion

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches the use of drills relating to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric A. Gates whose telephone number is 571-272-5498. The examiner can normally be reached on Monday-Thursday 7:45-6:15.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Boyer Ashley can be reached on 571-272-4502. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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